FIG. 1

FIG. 2

FIG. 3

FIG. 4
(PRIOR ART)

FIG. 4A
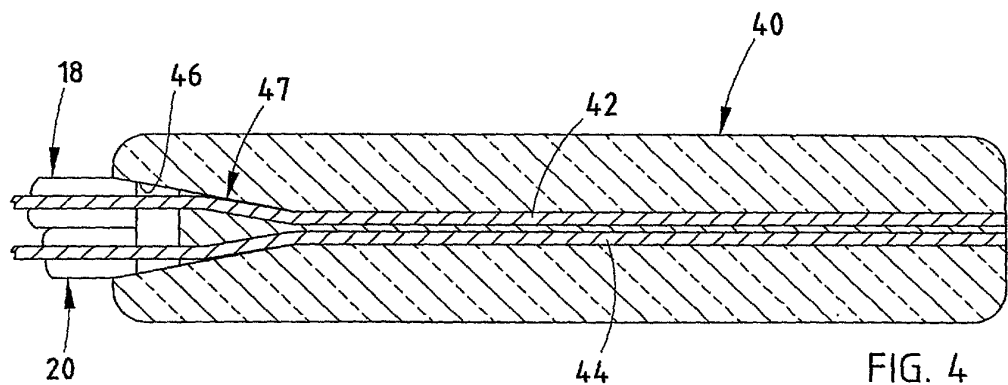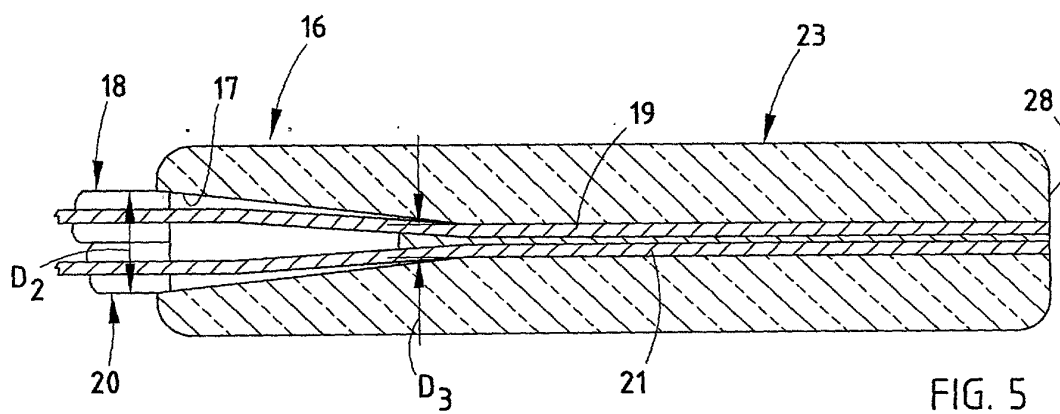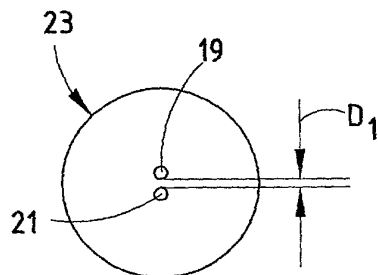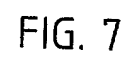(PRIOR ART)

FIG. 5

FIG. 5A

FIG. 6
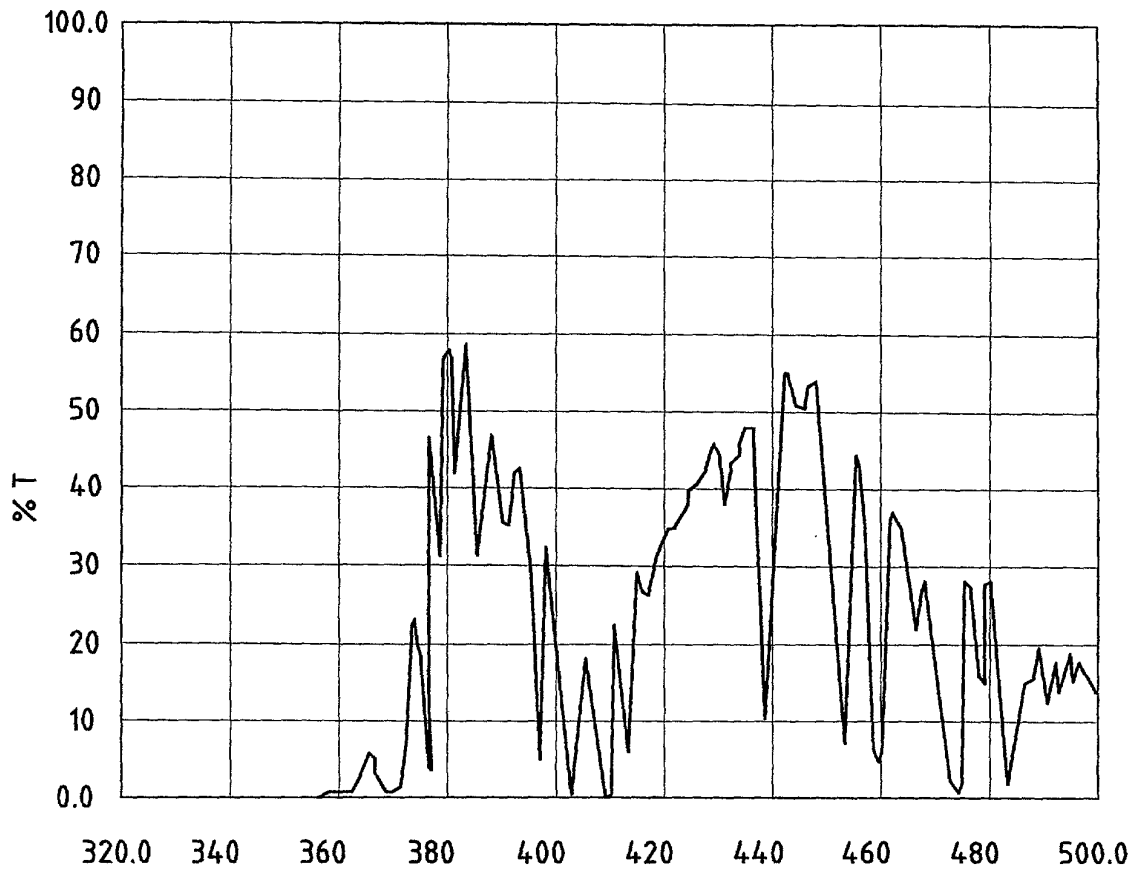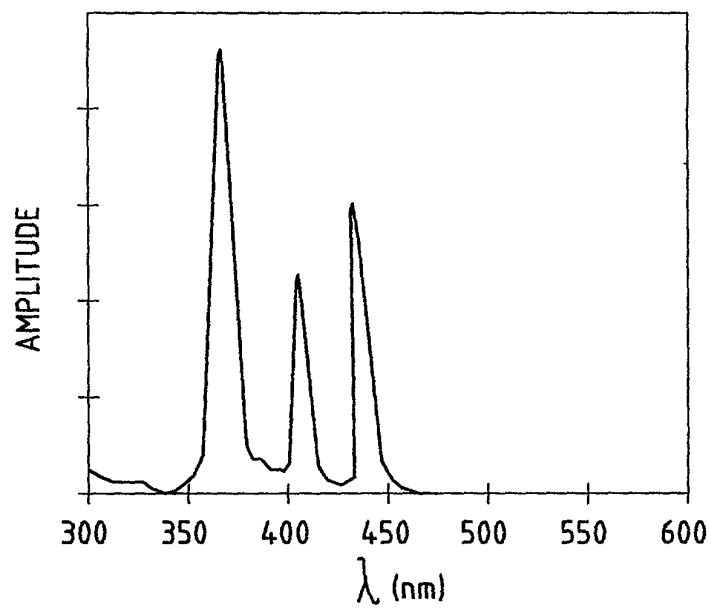
FIG. 7

FIG. 8

FIG. 9

FIG. 10

FIG. 11

FIG. 12
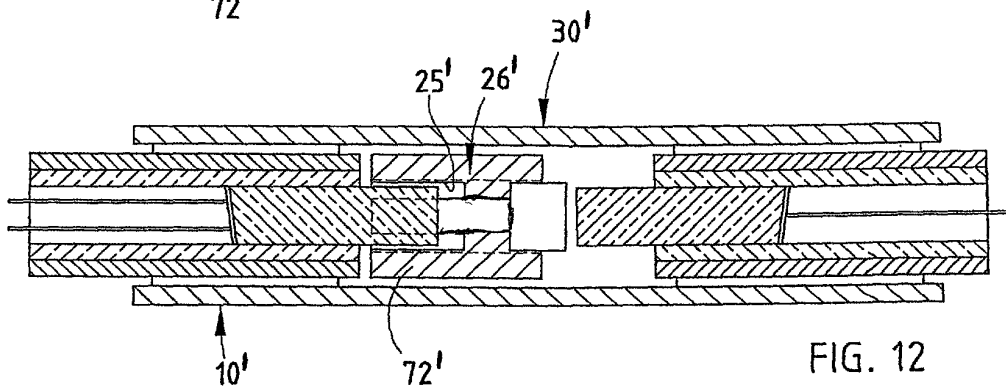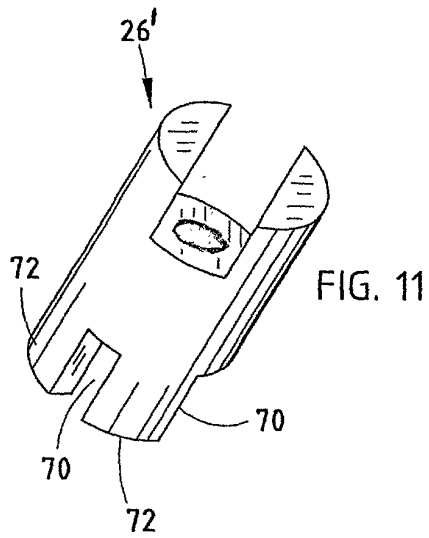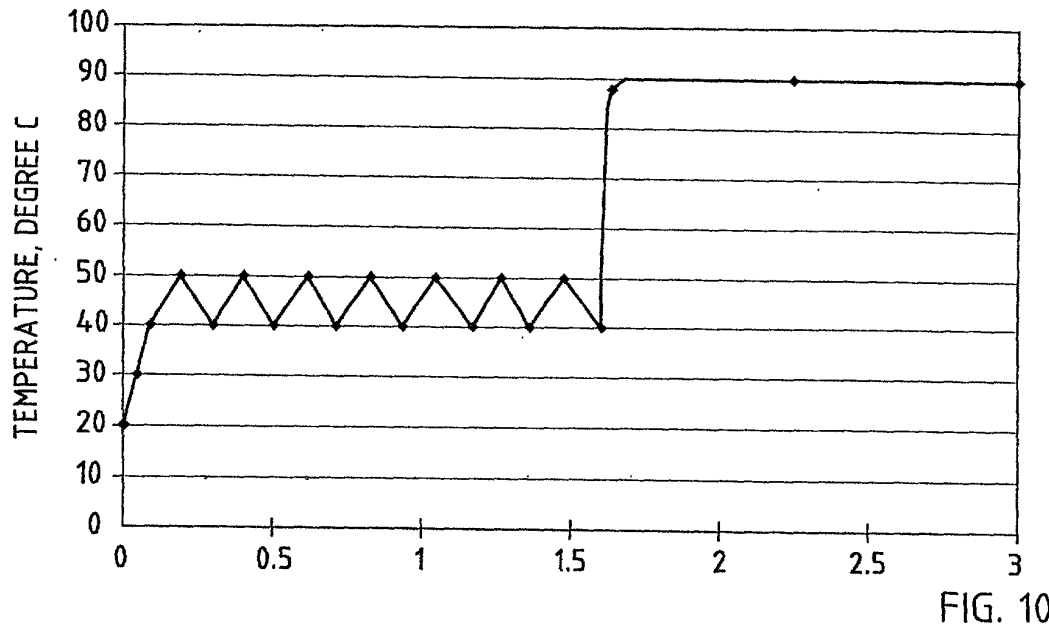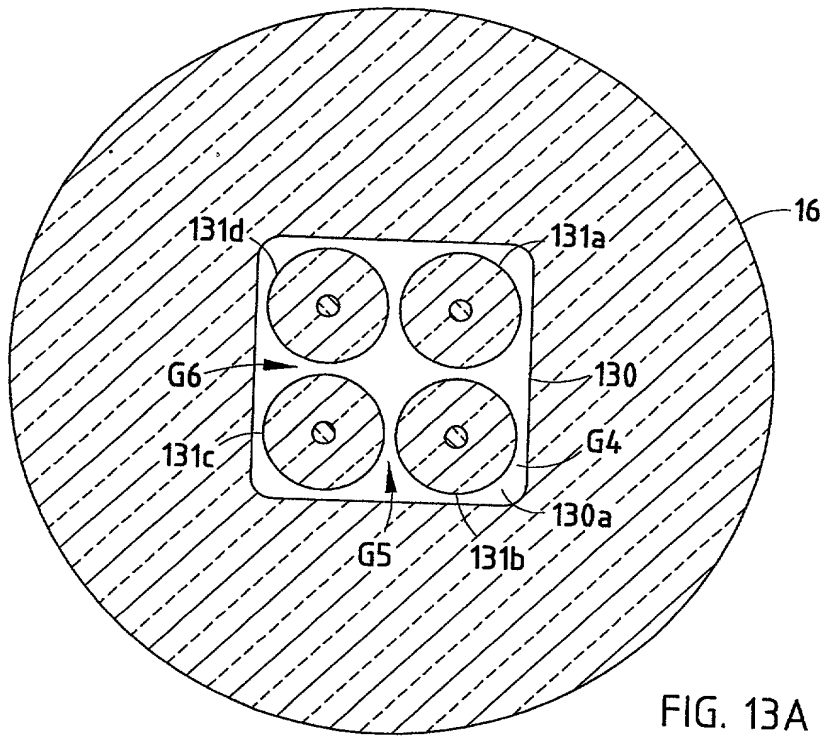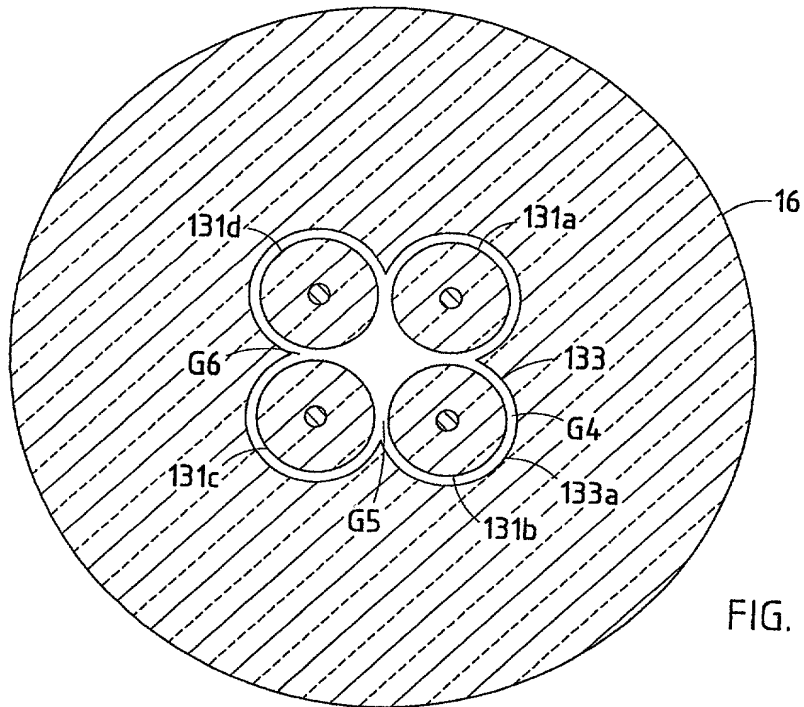
FIG. 13A
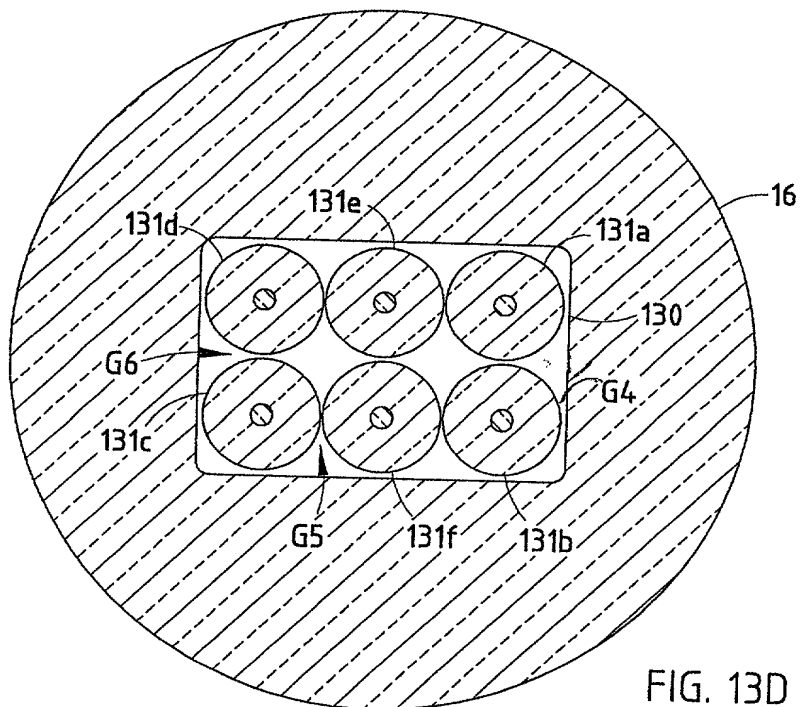
FIG. 13B

FIG. 13C

FIG. 13D

FIG. 13E

FIG. 13F

FIG. 13G

GOOD   BAD

FIG. 13H
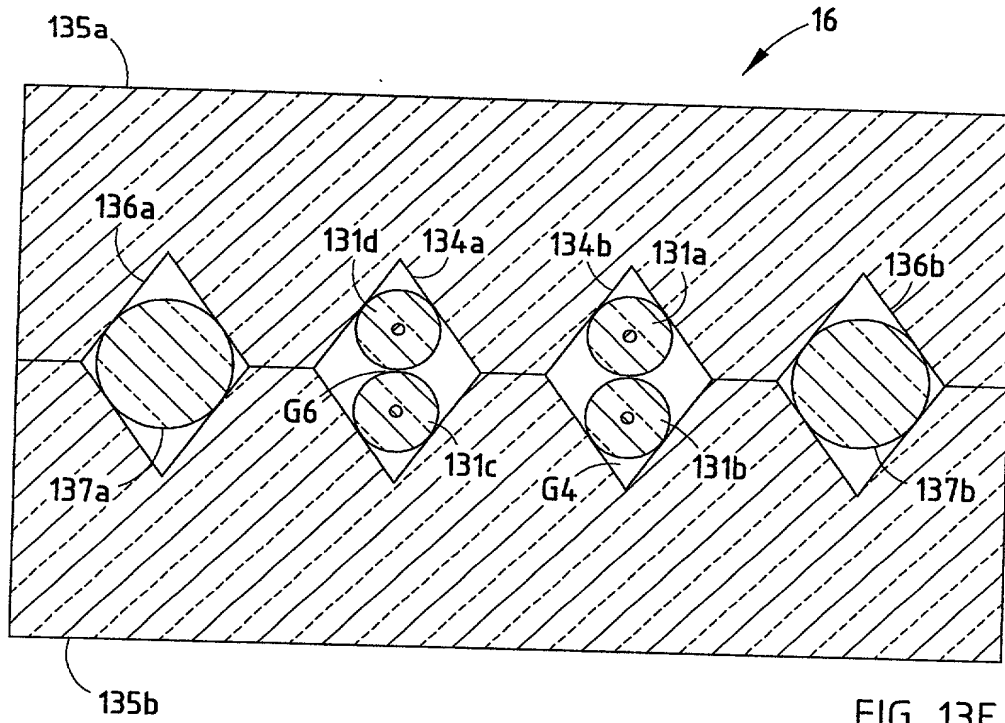
FIG. 13I
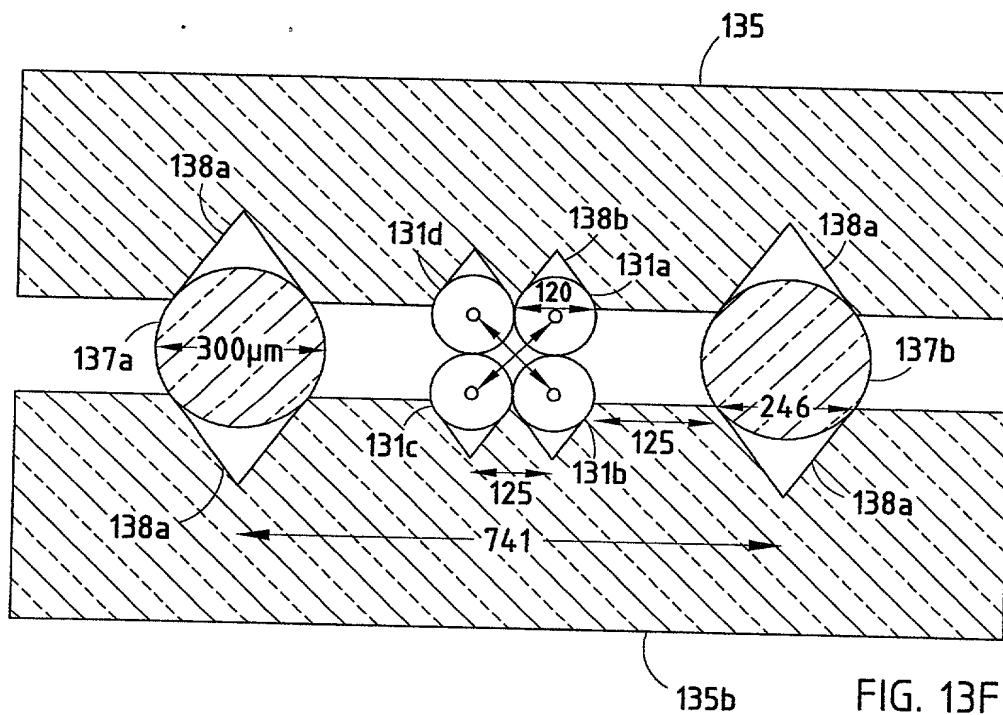
FIG. 13J
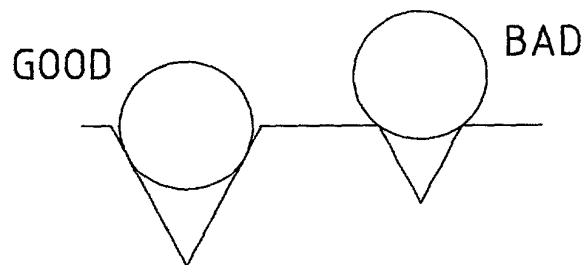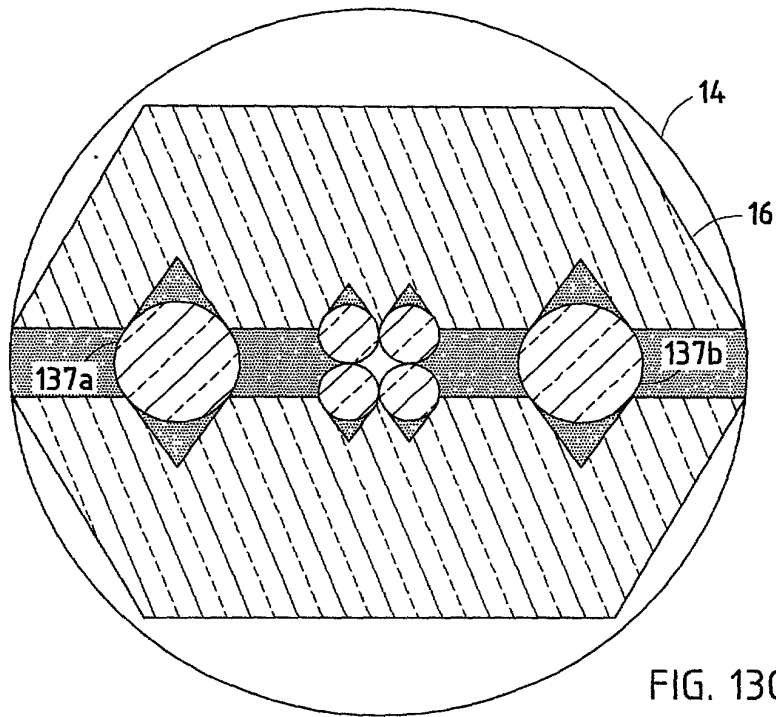
FIG. 13K
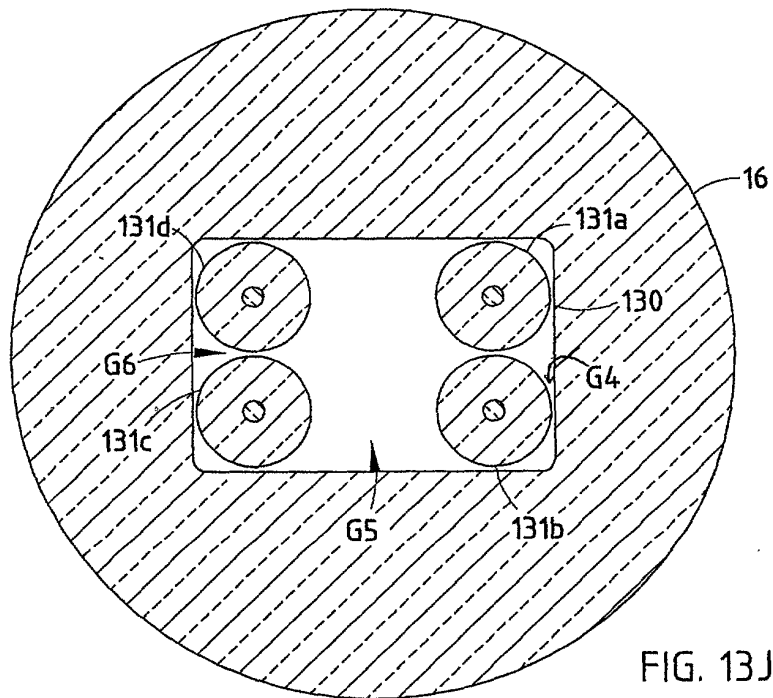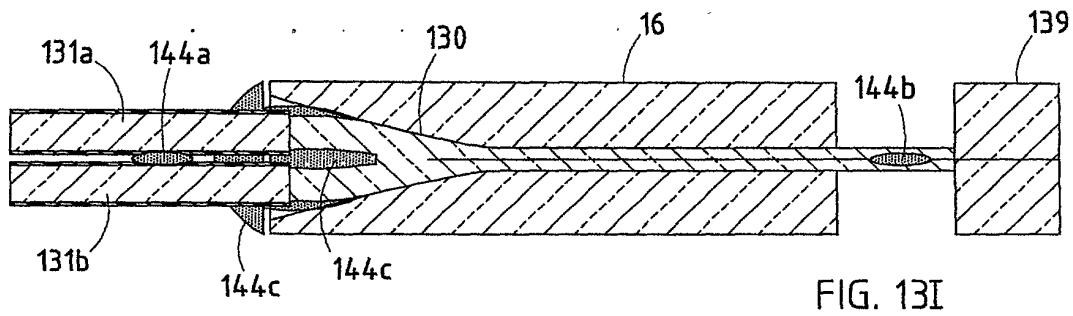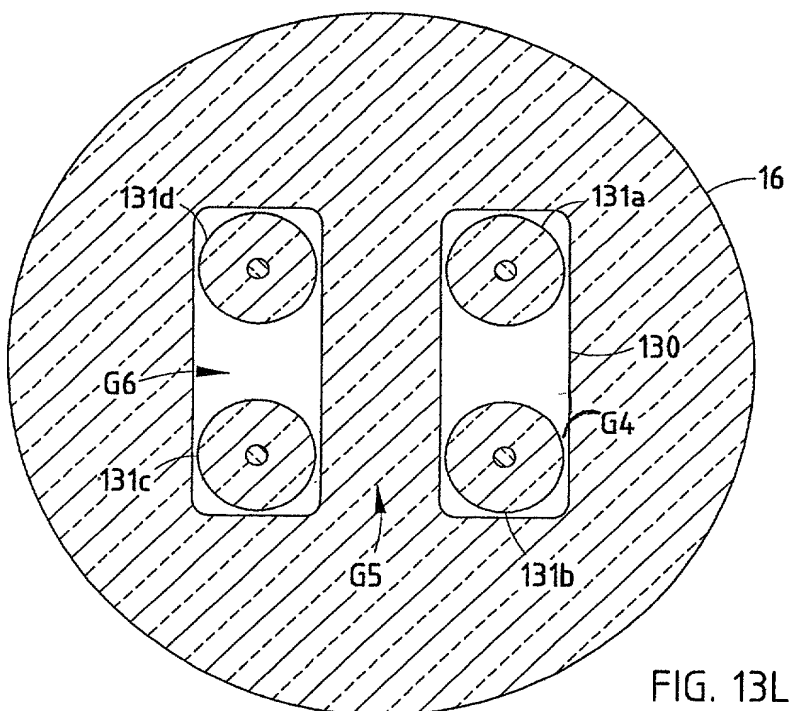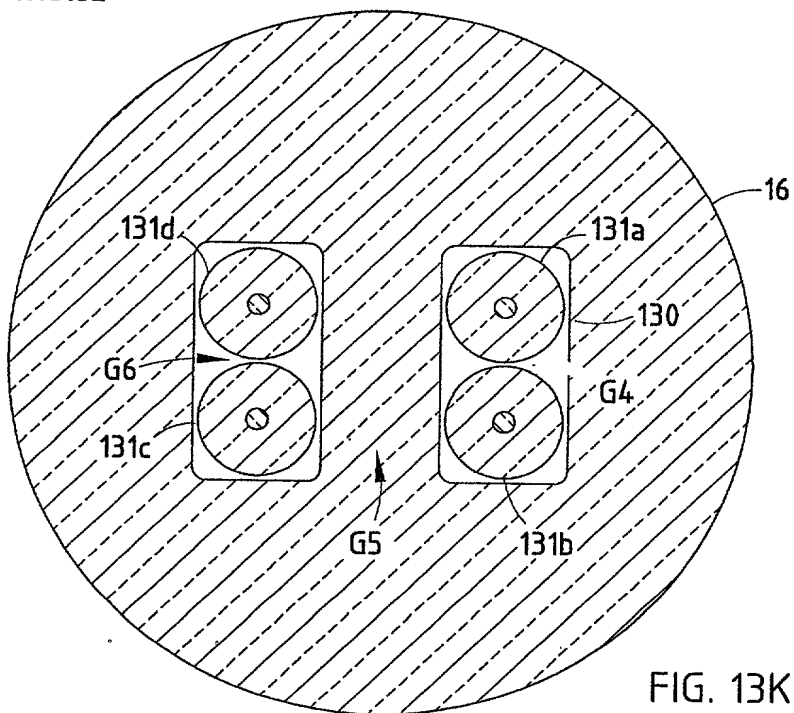
FIG. 13L

FIG. 13M

FIG. 13N
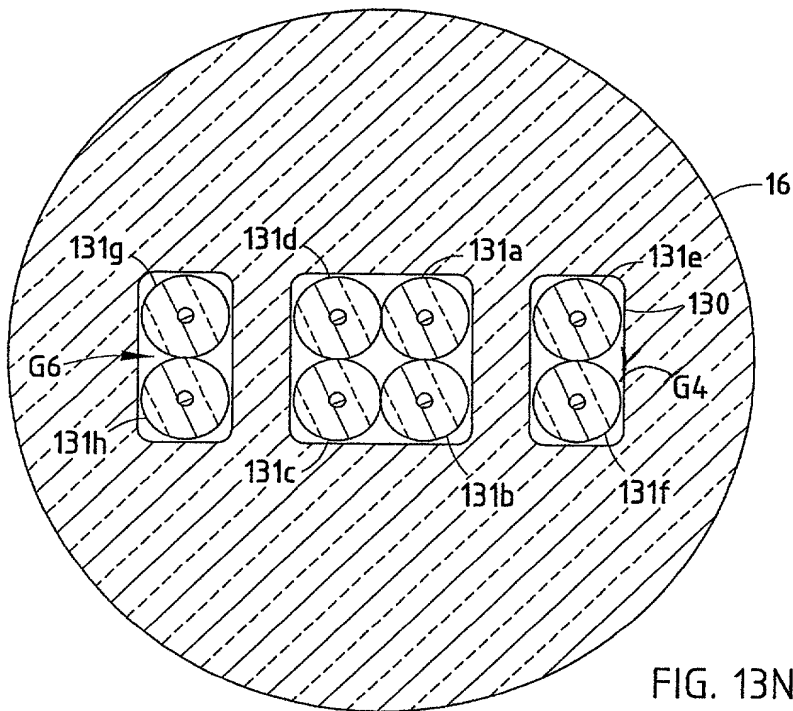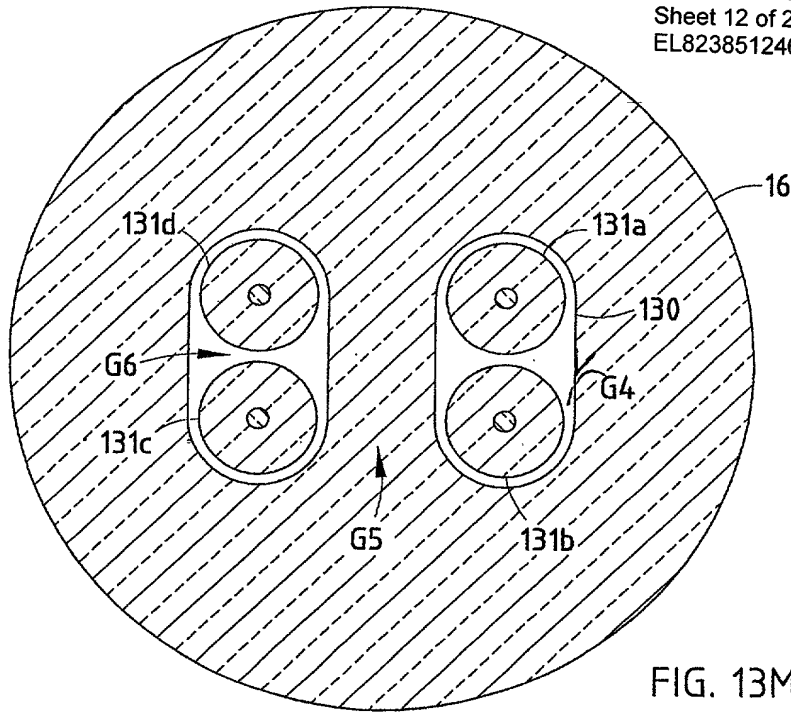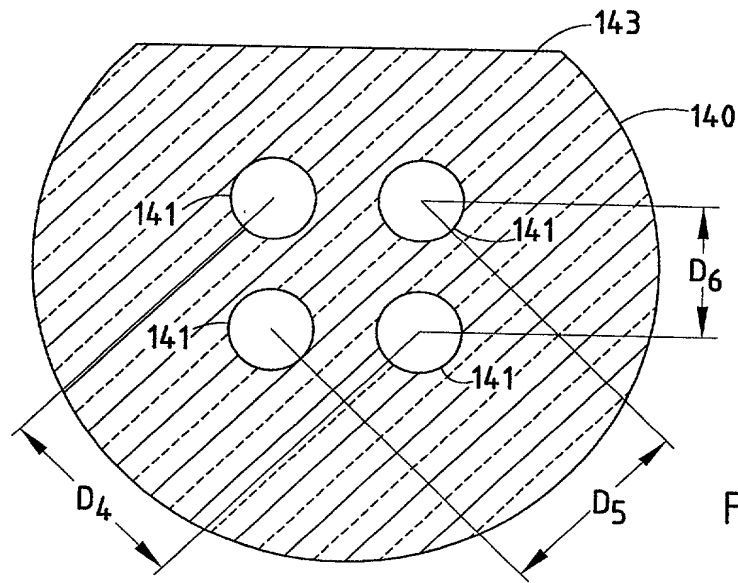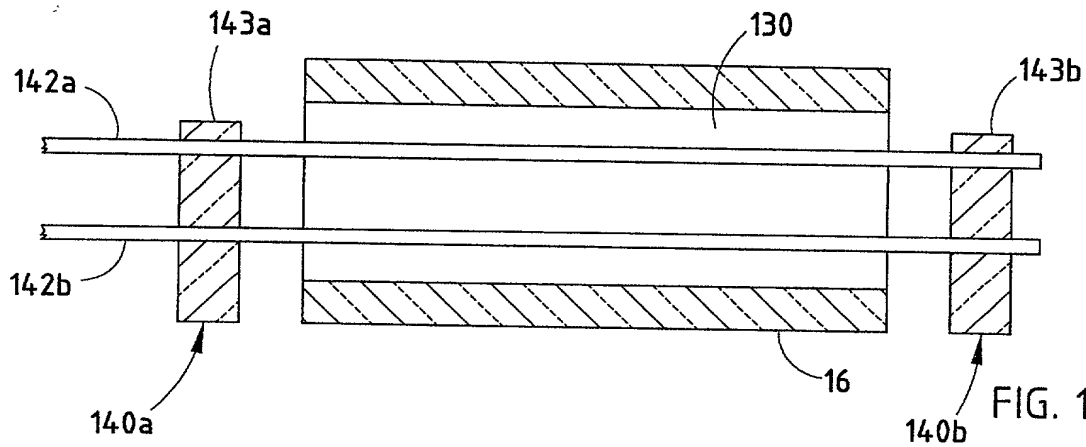
FIG. 14A

FIG. 14B

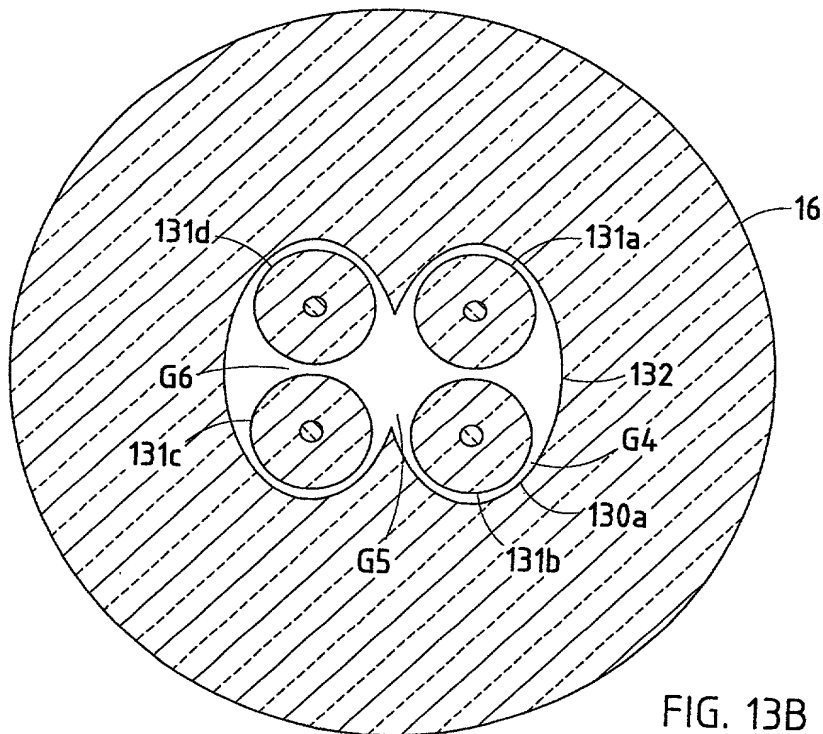| FERRULE SD	COLLIMATOR AOI	FILTER AOI RANGE	
125	1.84	1.800	1.866
129	1.91	1.866	1.930
134	1.97	1.930	1.992
138	2.03	1.992	2.052
142	2.09	2.052	2.111
146	2.15	2.111	2.167
149	2.21	2.167	2.223
.	.	.	.
.	.	.	.
.	.	.	.

FIG. 15
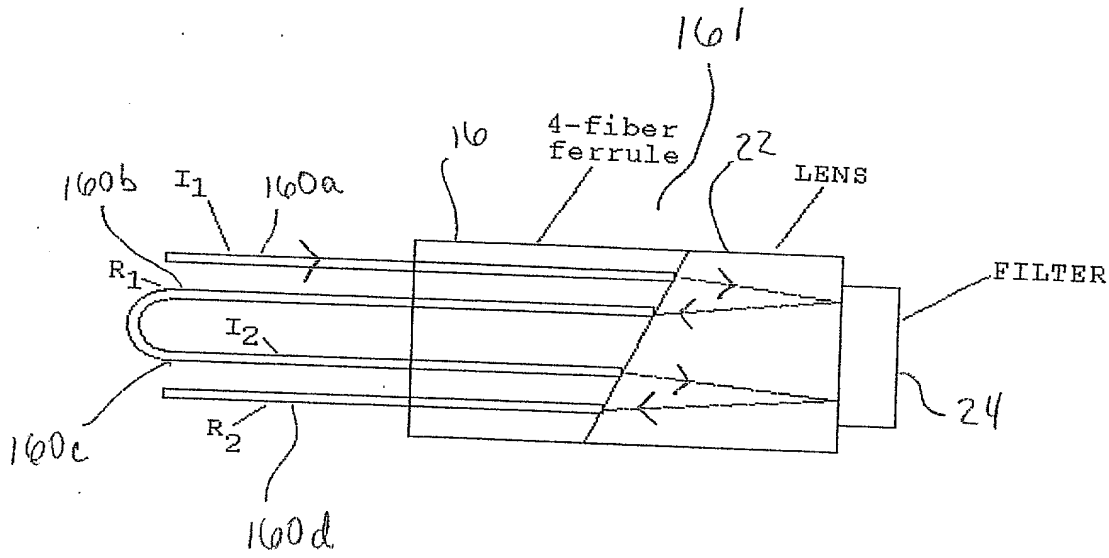
FIG. 16 A
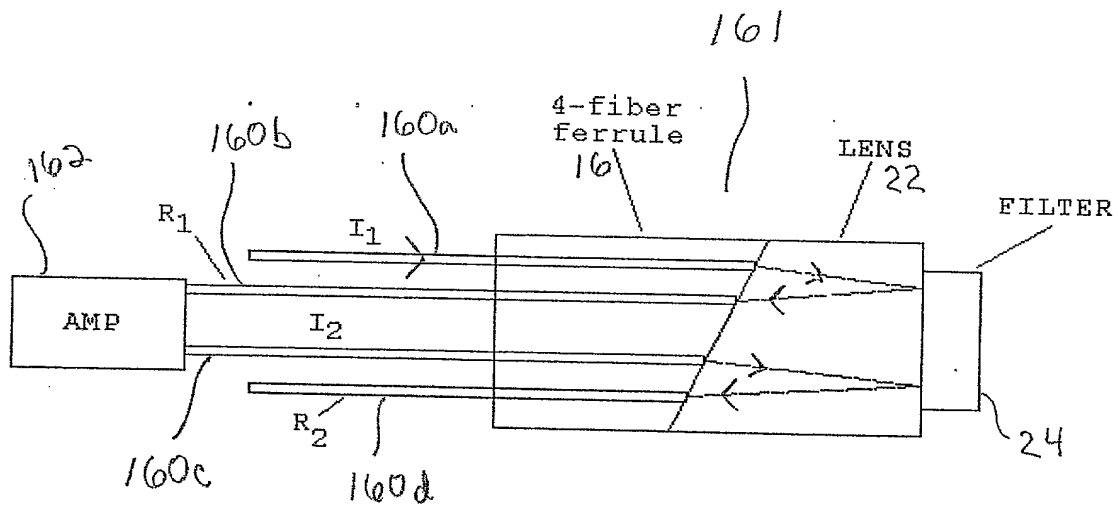
161

162

160b   160a

4-fiber
ferrule
16

LENS
22

FILTER

R₁

I₁

AMP

I₂

R₂

24

160c   160d

FIG. 16B

161

4-fiber
ferrule
16

160b   160a

162a

R₁   I₁

LENS
22

FILTER

AMP 1

I₂   160c

AMP 2

R₂

24

162b

160d

FIG. 16C

163

4-fiber ferrule 16

LENS 22

24 FILTER

LENS 34

single-fiber ferrule

160b

160a

I_1

R_1

I_2

160c

R_2

160d

35

35'

T

160e
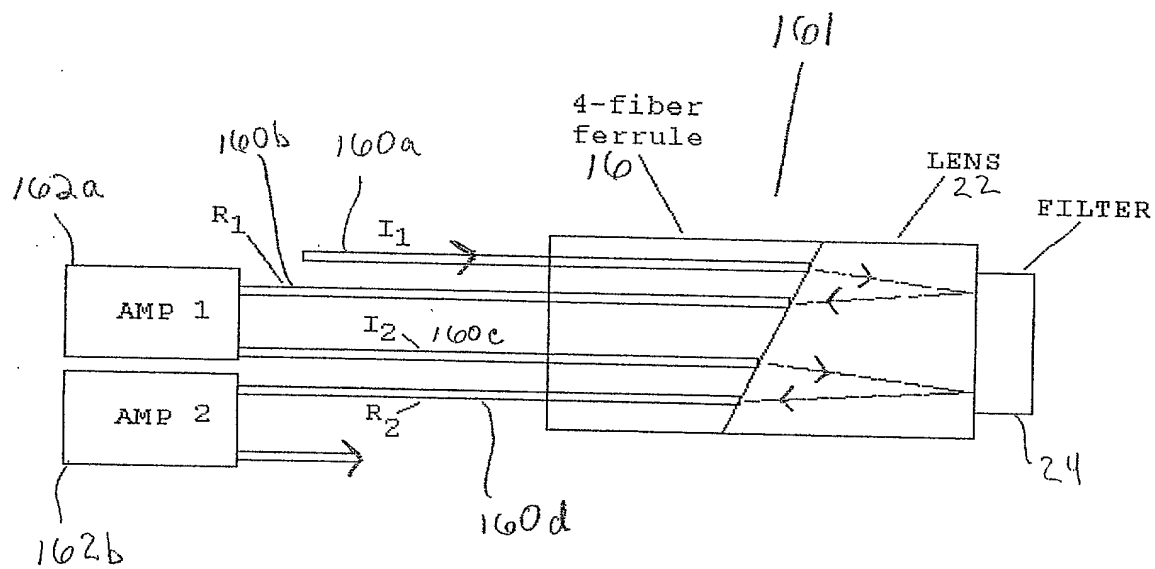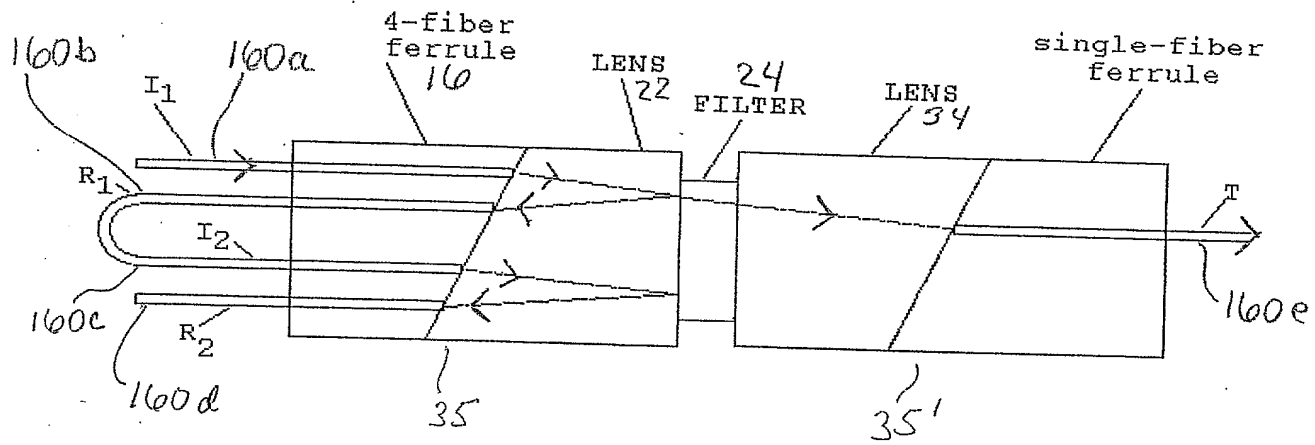
FIG. 16D

I — Input
R — Reflected
T — Transmitted

164

4-fiber ferrule
I_1 160a 16 LENS 22 FILTER 24 LENS 34 2-fiber ferrule 160e

160b

R_1

I_2 160c

T_1

R_2

160d

T_2

160f

TER 1

TER 2

165a

165b

FIG. 16E

I — Input
R — Reflected
T — Transmitted

4-fiber ferrule
10

LENS
22 FILTER
24

LENS
34

2-fiber
ferrule

160b I_1 160a

R_1

I_2

R_2

160c   160d

165a

T_1 TER 1

TER 2 T_2

165b

FIG. 16 F

I – Input
R – Reflected
T – Transmitted

166

I — Input
R — Reflected
T — Transmitted

FIG. 16H

171

$\lambda 1\text{-}\lambda n\ I_1$

$\lambda 2\text{-}\lambda n\ R_1$

$\lambda 2\text{-}\lambda n\ I_2$

$\lambda 1\text{-}\lambda n\ R_2$

4-fiber
ferrule
16

LENS
22

FILTER
24

LENS
34

2-fiber
ferrule

$T_1\ \lambda 1$
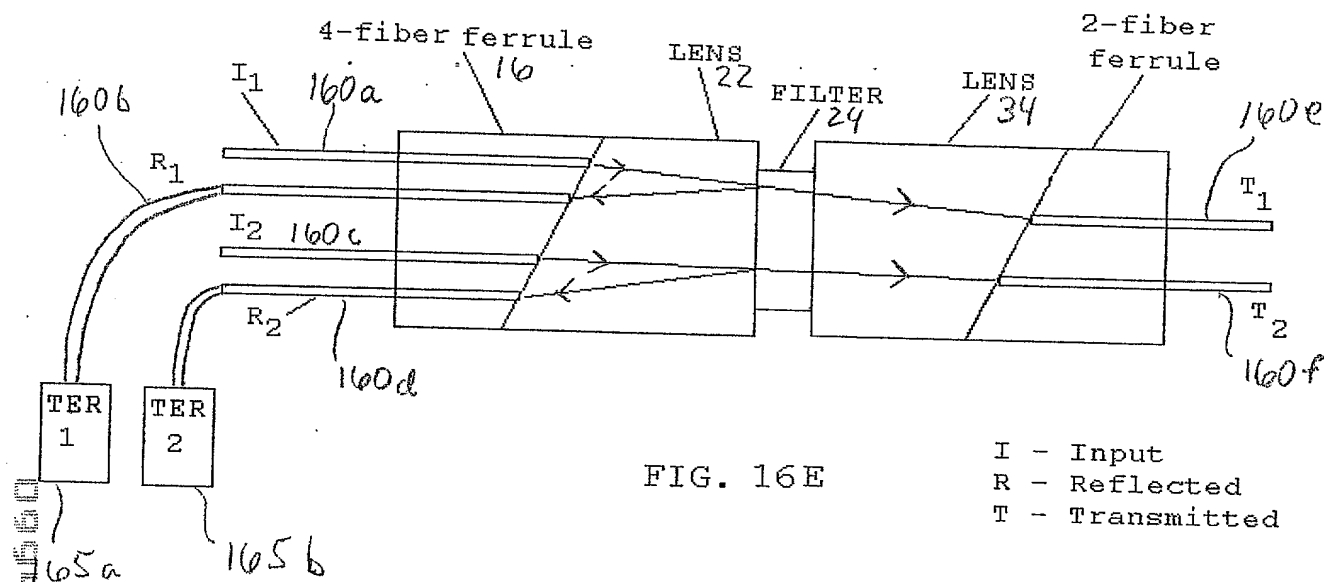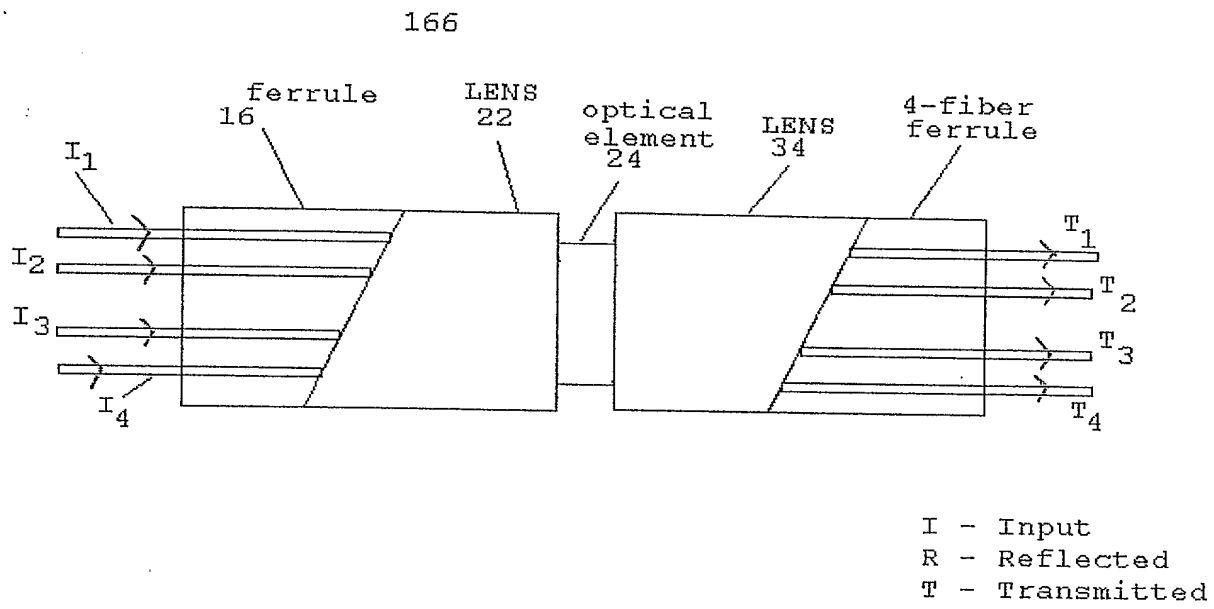
$I_3\ \lambda 1$
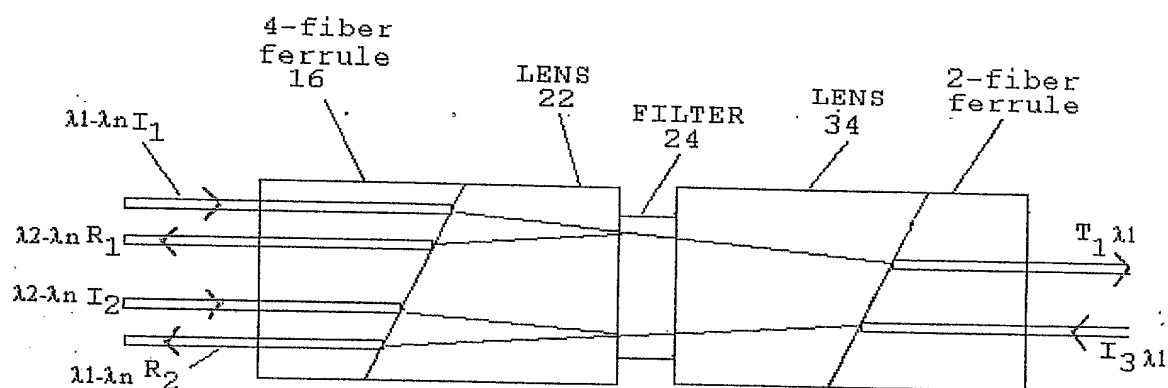
FIG. 16G

I – Input
R – Reflected
T – Transmitted

166

$$I - Input$$
$$R - Reflected$$
$$T - Transmitted$$

FIG. 16I

170

In Demux λ1-λn   I1   171a   22   24a   34   T1   Out Demux λ1

R1

In Mux λ1

I2

T5   171b   24b   T2   Out Demux λ2

R2

In Mux λ2

171c   24c   T3   Out Demux λ3

In Mux λ3

171d   24d   T4   Out Demux λ4

Out Mux λ1-λ4   In Mux λ4

Fig. 17